

A Community/School Outbreak of Pertussis

Investigated by

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Objectives

- **Describe the importance of appropriate laboratory testing**
- **Give the rationale for prophylaxis of contacts**
- **List the requirements to meet the surveillance case definition of pertussis**

BACKGROUND

Bordetella pertussis

- Small gram negative coccobacillus
- Strict aerobe
- Most fastidious species in the genus
- Typical growth appearance on Bordet-Gengou or Regan-Lowe media



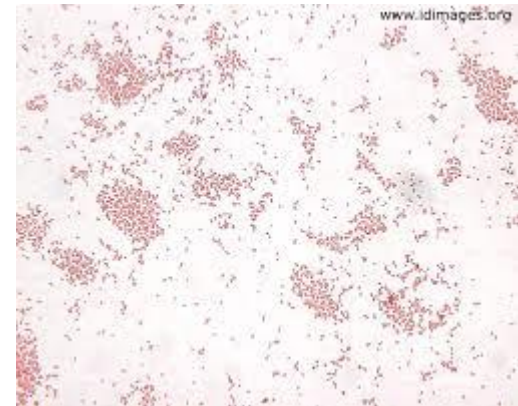
Bordetella pertussis

- Colonies are small, smooth, pearly, almost transparent-looking
 - Mercury droplet
- Uniquely human pathogen
- Transmitted through large respiratory droplets



Bordetella pertussis

- Incubation period – 5-21 days (7-10 days average)
- Disease of three stages
 - Catarrhal
 - Paroxysmal
 - Convalescent
- Polymerase Chain Reaction (PCR) now used for diagnosis with symptomatic patients



Bordetella pertussis

- **Primary infection occurs mainly in unimmunized children**
 - 25-30% have mild or atypical clinical picture
- **Adults play an important role in transmission**
 - Immunity from vaccination or natural infection wanes over time
 - Necessitates treatment of all direct contacts

INTRODUCTION

The Investigation Begins. . .

- LHD contacted by infection preventionist
 - 75 y.o. male
 - Various medical issues
 - Onset of cough – 2/20/15
 - Seen 3 times (HCP, ER twice, admitted)

Initial Response

- Trace Contacts of Patient
 - Family members
 - Direct contacts
- Post-exposure prophylaxis
- Vaccination
- Identification of other cases



METHODS

Case Definition

- Confirmed
 - Acute cough illness of any duration with isolation of *B. pertussis* from a clinical specimen, OR
 - Cough illness lasting ≥ 2 weeks, with
 - At least one of the following:
 - Paroxysms of coughing, or
 - Inspiratory whoop, or
 - Post-tussive vomiting, or
 - Apnea (infants <1 year of age), AND
 - PCR positive for pertussis, or
 - Contact with a lab-confirmed case

Case Definition

- **Probable**
 - Cough illness lasting ≥ 2 weeks, with
 - At least one of the following:
 - Paroxysms of coughing, or
 - Inspiratory whoop, or
 - Post-tussive vomiting, or
 - Apnea (infants <1 year of age), AND
 - Absence of lab confirmation, AND
 - No epi link to a lab-confirmed case

Case Definition

- Probable for infants <1 year of age
 - Acute cough of any duration
 - At least one of the following:
 - Paroxysms of coughing, or
 - Inspiratory whoop, or
 - Post-tussive vomiting, or
 - Apnea, AND
 - PCR positive for pertussis, OR
 - Contact with a lab-confirmed case

Epidemiologic Methods

- **Line list with family members**
 - Wife
 - Son & daughter-in-law
 - Daughter & son-in-law, 2 school-age grandchildren
- **Other Direct Contacts**
 - Next door neighbors
- **Provide prophylaxis to patient's family and direct contacts**

The plot thickens....

- **Wife symptomatic since 2/6/15**
 - Special Education aide at elementary school
 - Placed on azithromycin 2/26/15
 - First grader she works with symptomatic since 2/12/15
- **Daughter asymptomatic**
 - First grade teacher in same elementary school
 - Two children in classroom symptomatic (onsets 2/17/15 and 2/23/15)
 - Teacher's daughter (HS student) symptomatic since 2/1/15

Epidemiologic Methods

- School nurses prepare line list of symptomatic children and employees (including bus drivers)
- Check immunization status of children in affected classrooms
- Prophylax the families of the 3 symptomatic children
- Prophylaxis of all direct contacts of symptomatic patients
- Health alert to area health care providers
- Letter to parents of school children
- LHD staff met with school staff

Laboratory Testing

Type of Test	Number Tested
Polymerase Chain Reaction	9
Culture	1
Serology	1

RESULTS

Population Exposed

	Community members, residents, students, or attendees	School Staff
Total number in the community/facility	442	43
Number exposed	148	13
Number vaccinated AFTER outbreak	44	25
Number receiving post-exposure prophylaxis (antibiotic)	84	11
Number of non-immune excluded from school/daycare or furloughed from work	0	0
Baseline vaccination rate of students at school	100%	

Case Patients

	Community members, residents, students, or attendees	School Staff
Number ill	7	1
Number meeting PROBABLE case definition	2	0
Number meeting CONFIRMED case definition	2	1
Number of cases vaccinated and up-to-date prior to outbreak	6	0
Number of cases vaccinated but NOT up-to- date prior to outbreak	1	1
Number of cases NOT vaccinated at all	0	0
Number admitted to hospital	1	0
Number of deaths	0	0

Data

- 8 symptomatic
 - 6 paroxysmal coughing (75%)
 - 5 post-tussive vomiting (63%)
 - 3 did not cough long enough
 - Average cough (confirmed and probable) – 20.4 days
- Laboratory testing
 - 10 tested – 3 PCR positive, 1 IgA antibody positive
 - 2 PCR positives were not cases – didn't cough long enough
 - 1 culture negative

CONCLUSION

Summary

- **Eight symptomatic individuals**
 - 1 community
 - 7 school-associated
- **Most were school-aged children**
- **Prophylaxis (95 contacts in 49 households)**
 - 2 First Grade classrooms + teachers and aides
 - 1 Fourth Grade classroom + teacher and aides
 - Special Education classroom + teacher and aides
 - Immediate families of all confirmed/probable cases
 - Bus mates in assigned seats around probable cases + drivers
 - Church attendees associated with 1 probable case

Limitations

- Vaccination records were available, but missing from the electronic system
- Health care providers ordered inappropriate testing

Lessons Learned

- Being available to answer questions helps calm community fear
- Opportunity to educate the public on the importance of vaccination
- Good communication between community partners is essential to good outcomes
- Education of health care providers to suspect pertussis and treat appropriately must continue

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Questions?

